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(54) **VISUALIZATION DEVICE FOR DUST COLLECTION OF VACUUM CLEANER**

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A47L 9/10 (2006.01)

(52) **U.S. Cl.**
USPC **15/339**; 15/415.1; 15/347; 15/353

(58) **Field of Classification Search**
USPC 15/347, 353, 339, 415.1
IPC A47L 9/10,9/02, 7/00
See application file for complete search history.

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(57) **ABSTRACT**

The present invention comprises: a collecting section mounted at one side of the pathway, in which the suction force of a vacuum cleaner for sucking dust is transmitted, and moves at least some of the sucked dust towards one direction; a dust collecting section made of transparent material coupled with the collecting section, in which the receiving status of the inflow of dust through the collecting section is exposed to the outside; a discharge section which guides air and dust, which has passed through the dust collecting section, to be discharged into the pathway that transmits the suction force of a vacuum cleaner; and a foreign material discharge means which guides the flow of air into the inner corner of the dust collecting section by the operation of the user and forcibly discharges the remaining dust in the dust collection section to the outside. According to the present invention, the invention enables the user to check the status of the dust that is sucked and the convenient discharge of the dust collected in the inside of the collecting section.

10 Claims, 12 Drawing Sheets

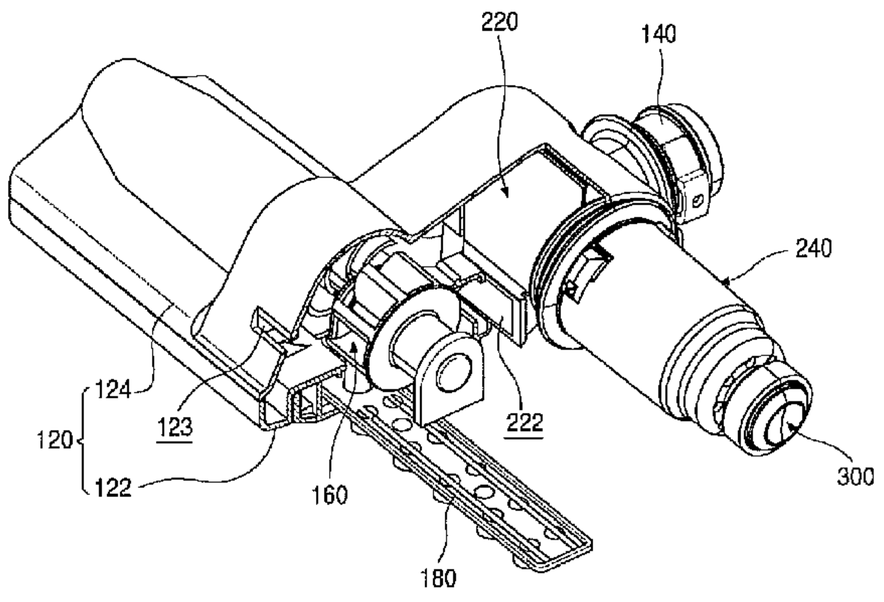

Fig. 1

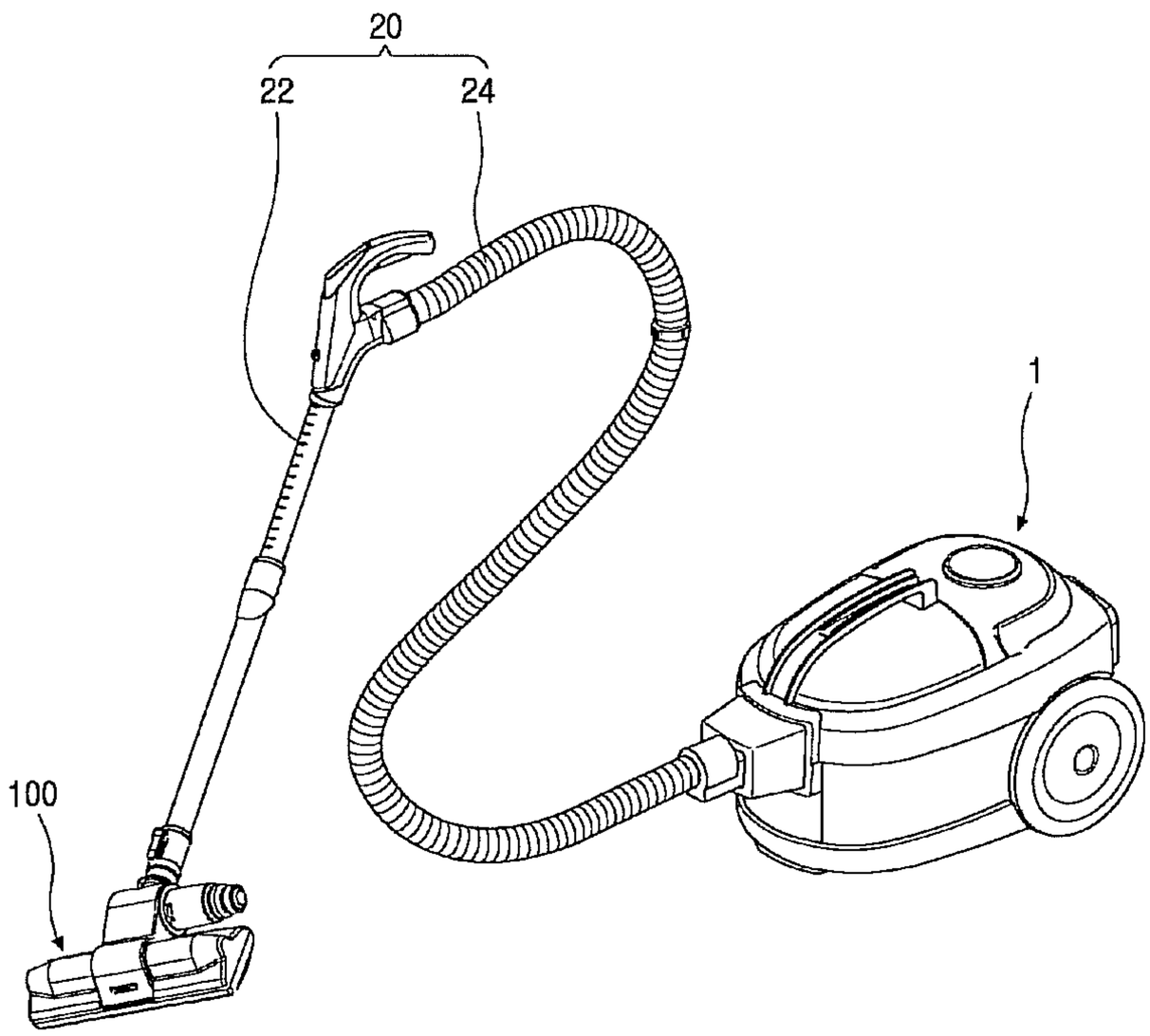

Fig. 2

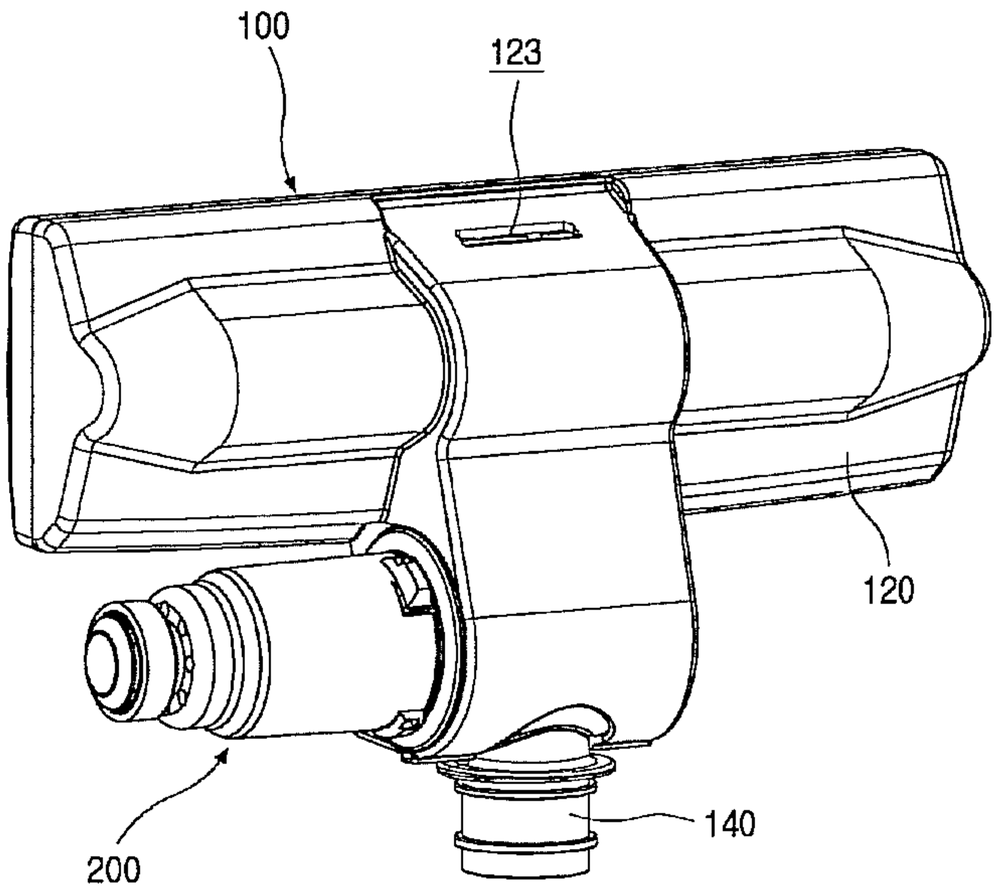

Fig. 3

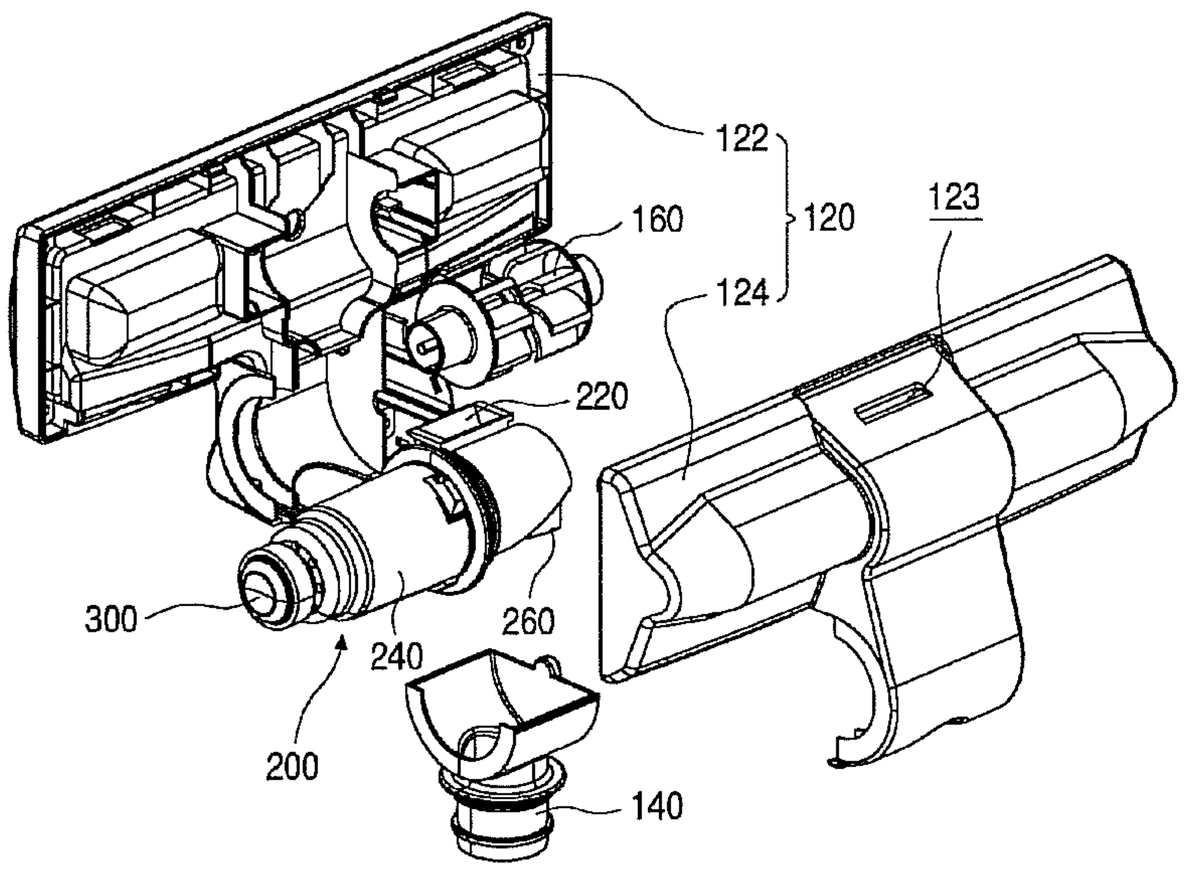

Fig. 4

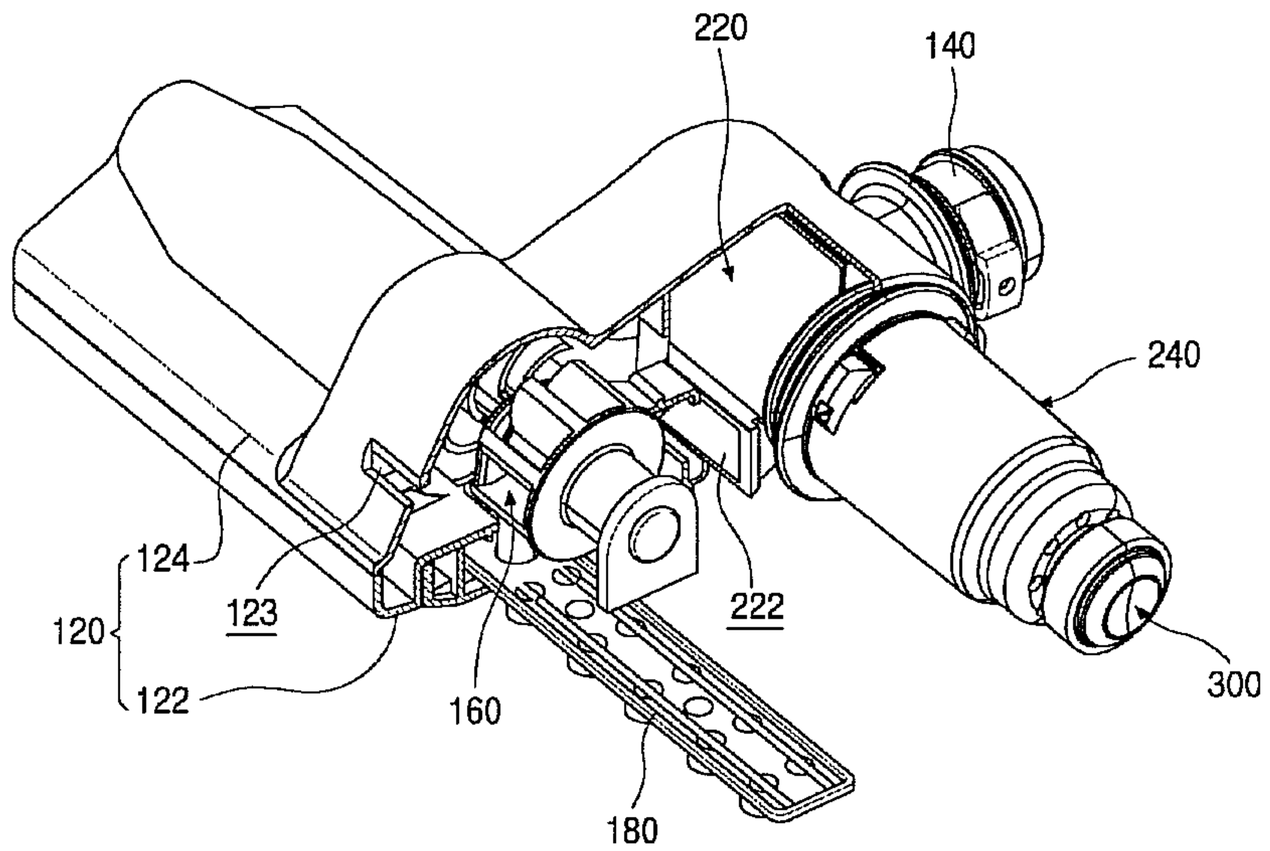

Fig. 5

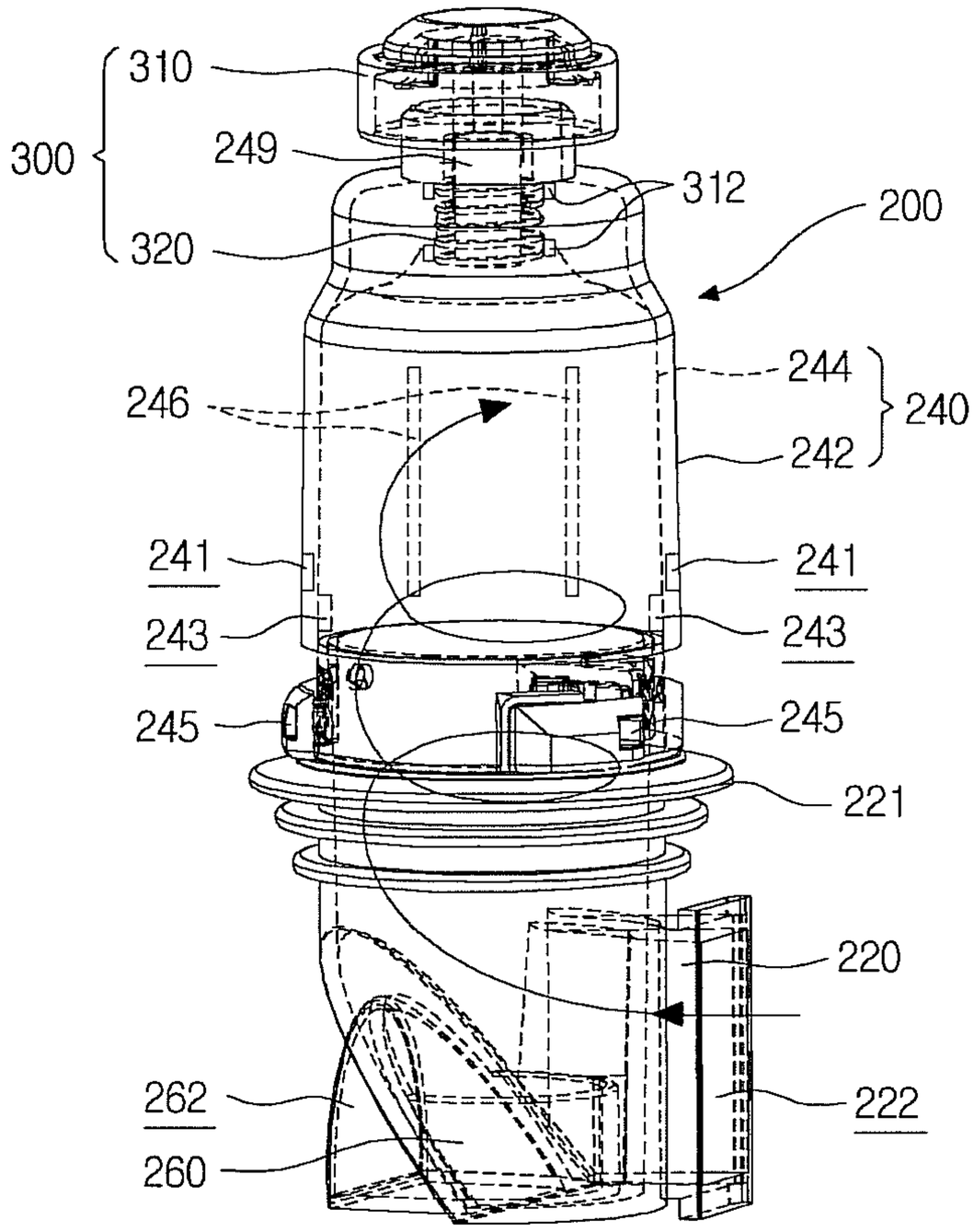
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Fig. 6

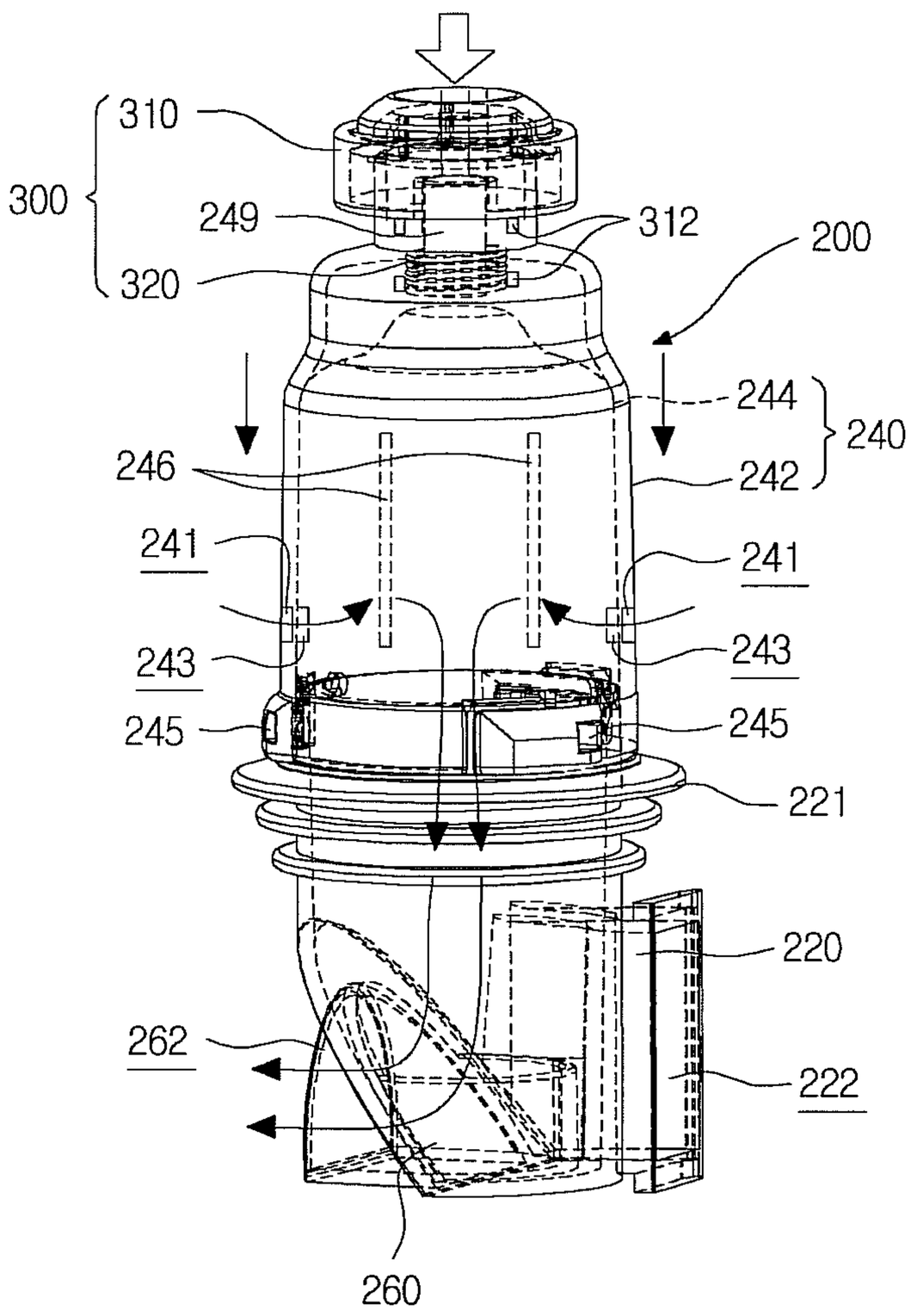
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Fig. 7

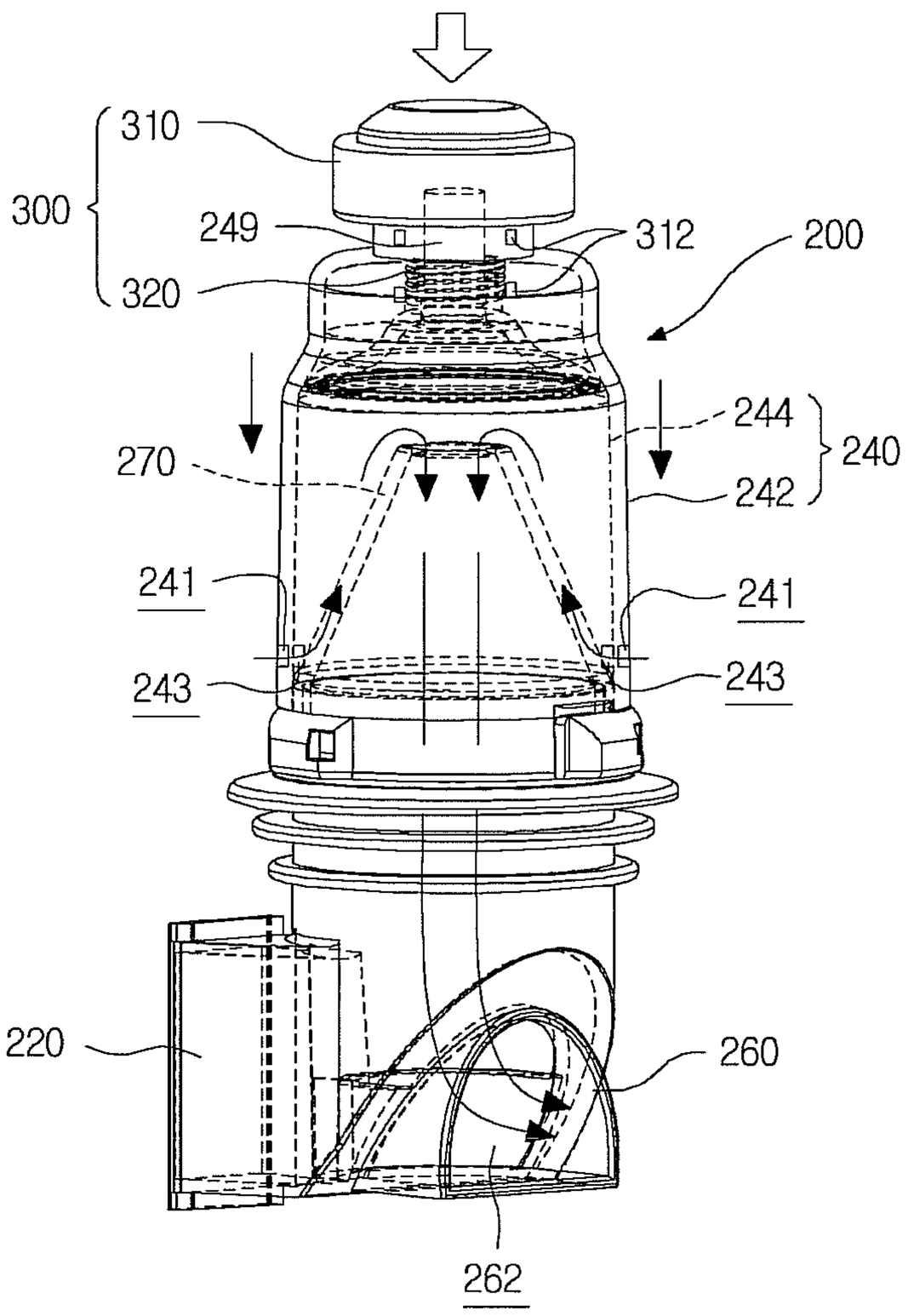
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Fig. 8

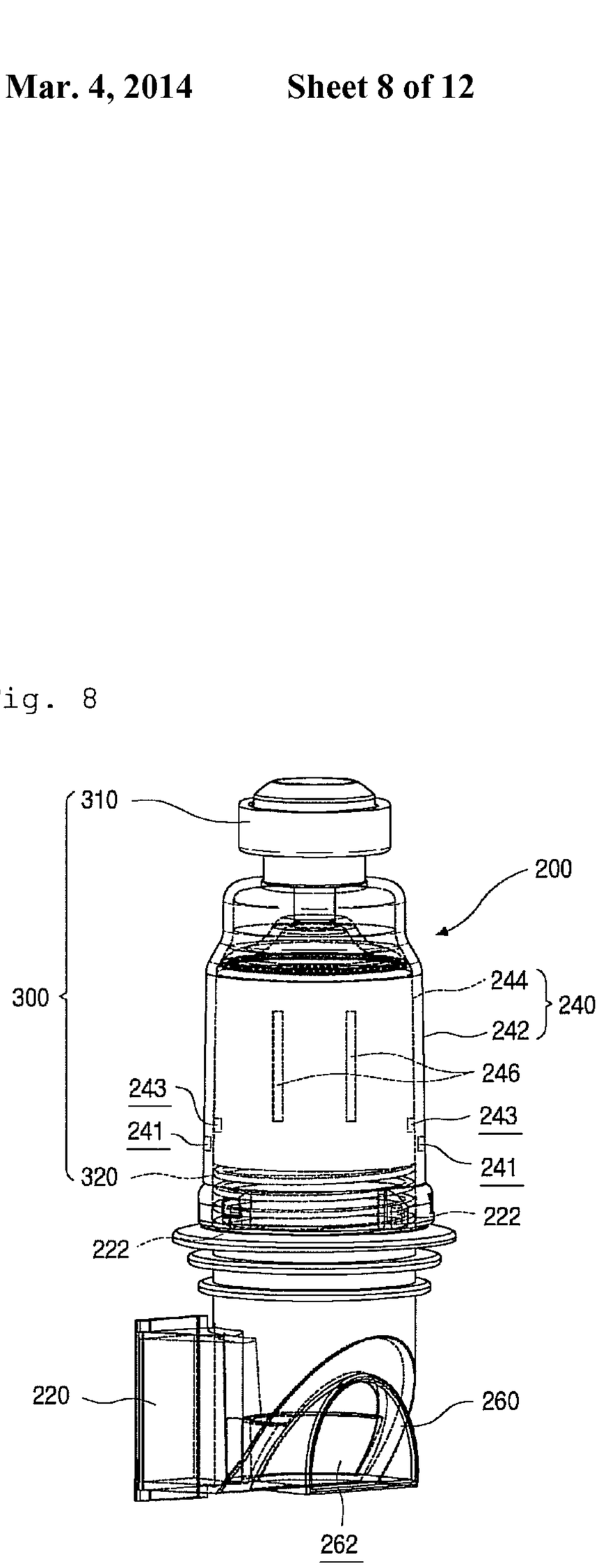
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Fig. 9

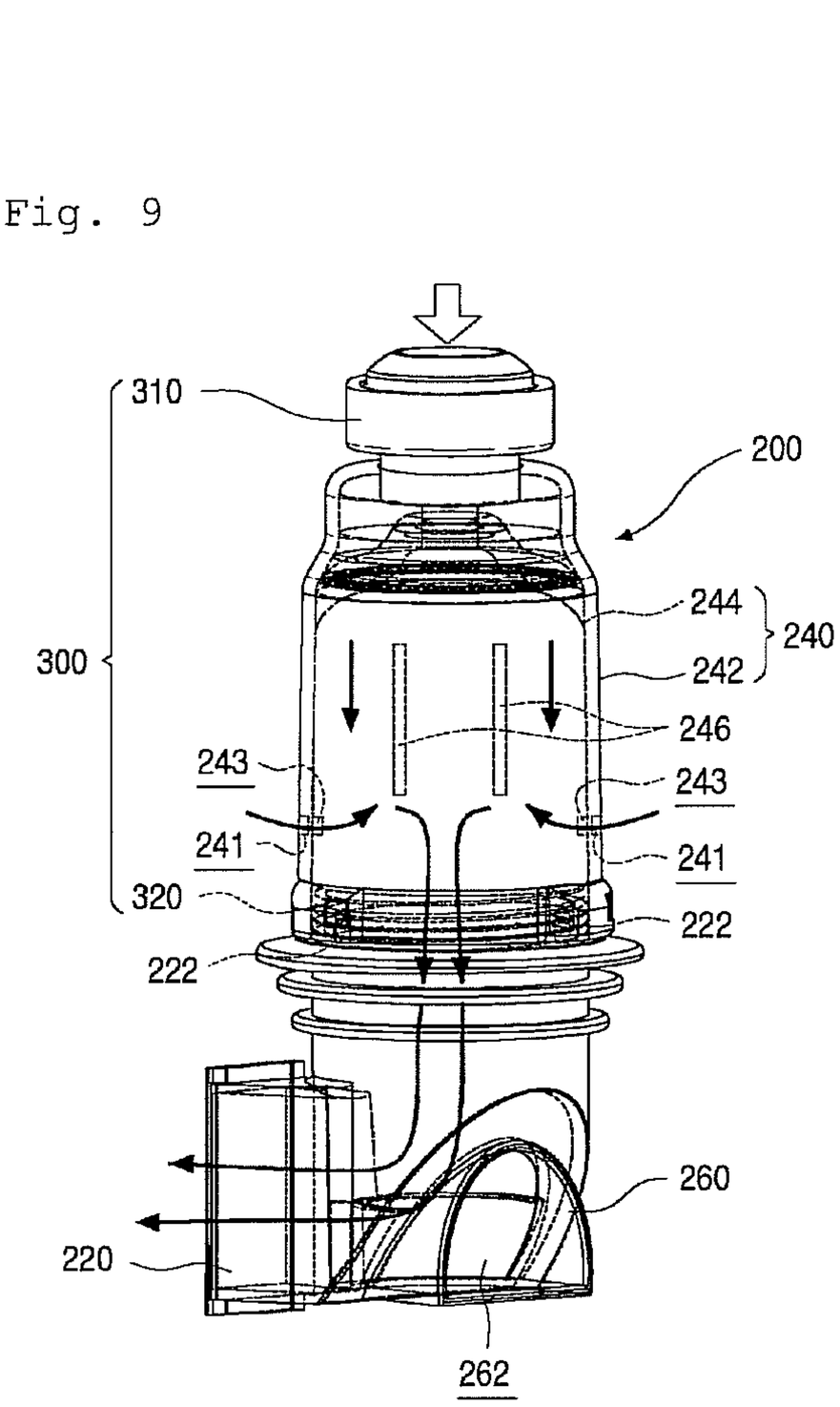
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Fig. 10

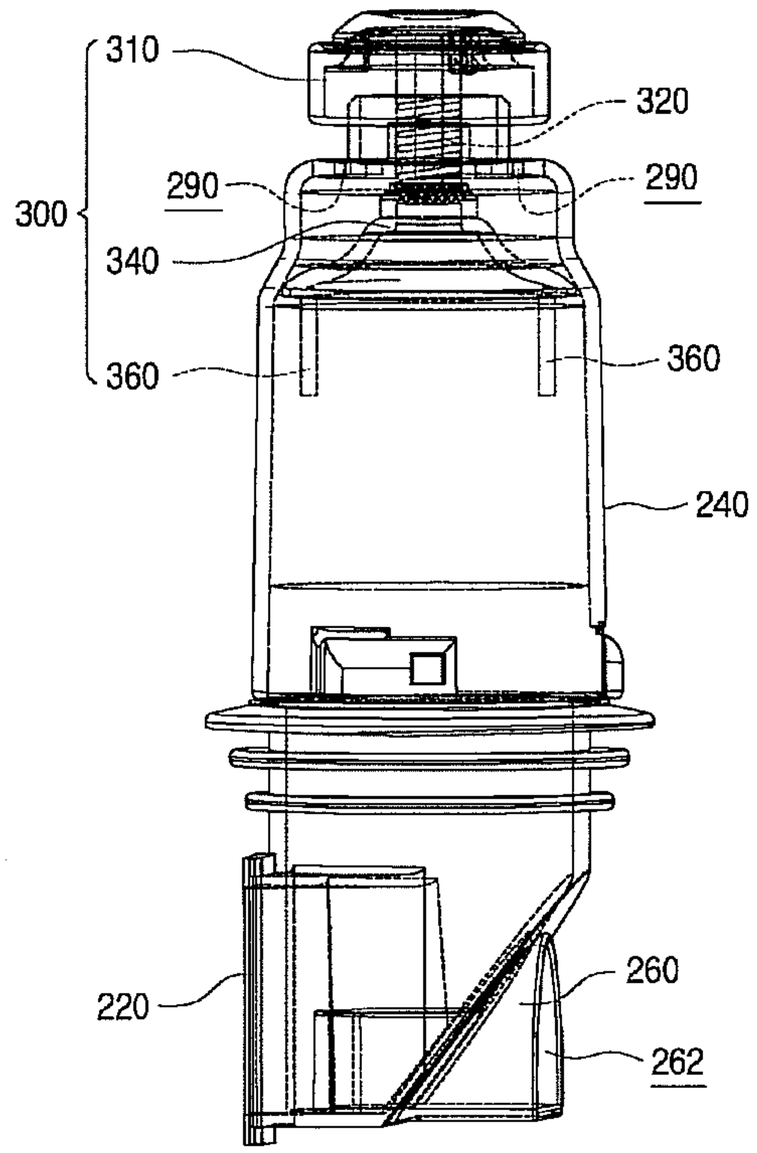


Fig. 11

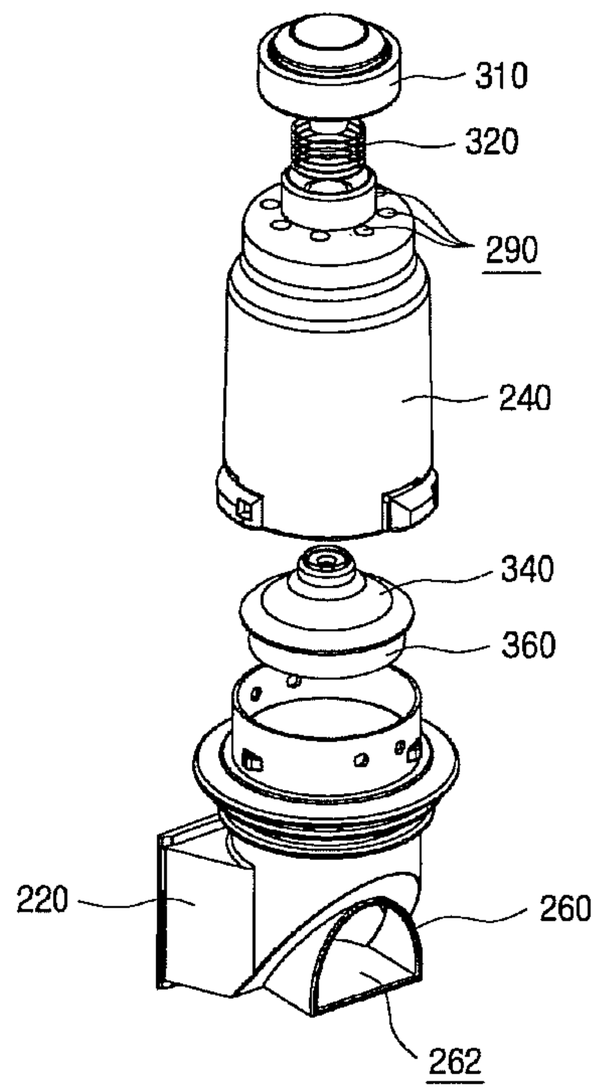
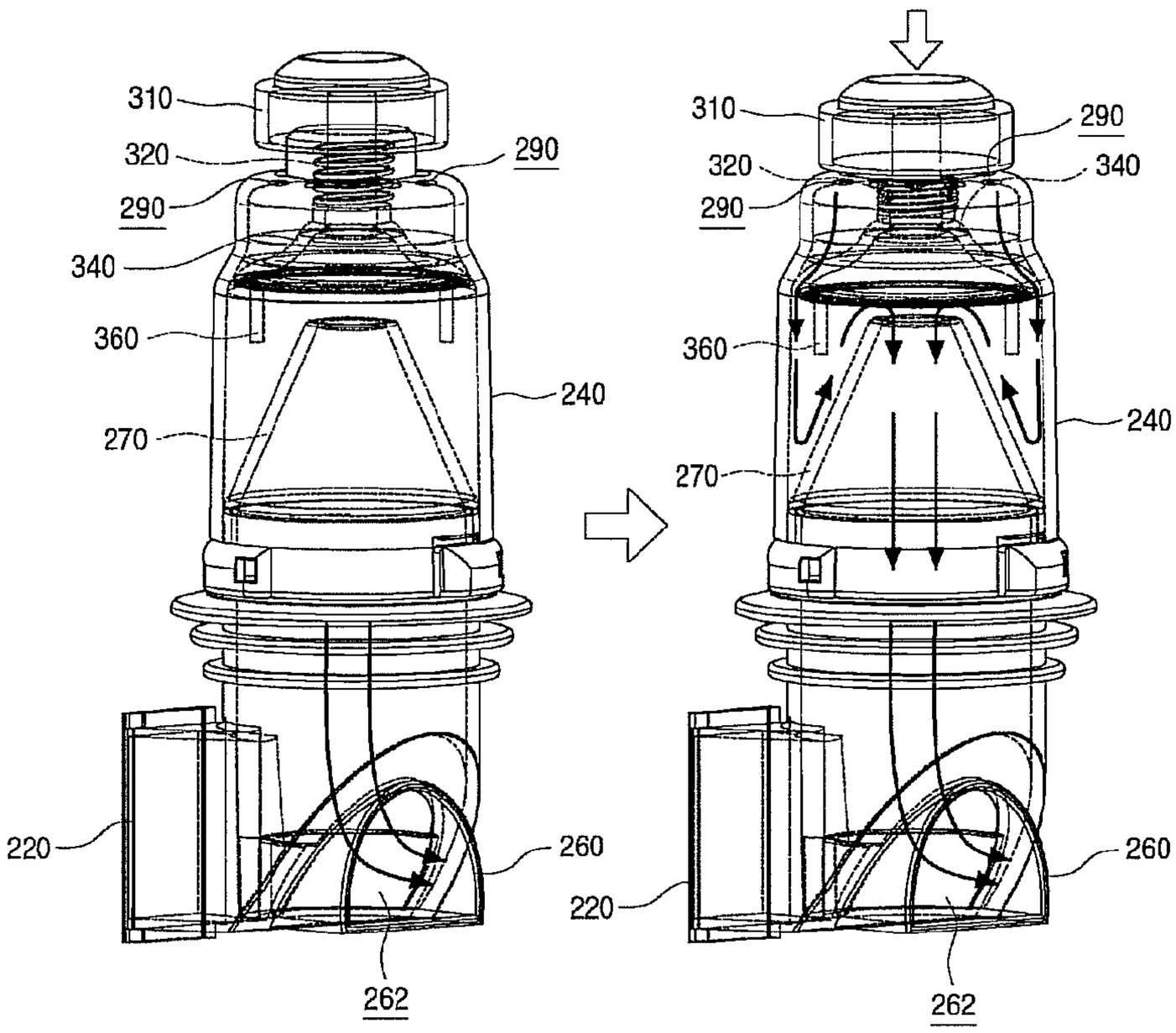


Fig. 12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VISUALIZATION DEVICE FOR DUST COLLECTION OF VACUUM CLEANER

TECHNICAL FIELD

The prevent disclosure relates to a visualization device for dust collection of a vacuum cleaner checking suction condition of a dust.

BACKGROUND

In general, the vacuum cleaner suctioning a dust and a foreign material along with air and filtering them at the inside of a body using a suction motor mounted at the inside of the body.

The vacuum cleaner having the same function as above includes a canister type in which a nozzle, that is, a suction port is communicated with the body through a connection tube, and a upright type in which the nozzle is formed integrally with the body.

Further, in the vacuum cleaner divided as above, the dust collecting device of a bag filter type or cyclone dust collecting type may be used to filter and store the dust and the foreign material among the air. However, most of the vacuum cleaner launched recently adapts the dust collecting device of cyclone dust collecting type due to reasons such as ease of use and maintenance costs.

On the other hand, if a user performs cleaning operations using the vacuum cleaner, when it is checked with eyes whether or not the dust is suctioned, the reliability of the performance of vacuum cleaner and the satisfaction for cleaning operations may be improved.

Thus, in the vacuum cleaner, the visualization device for dust collection showing the suction condition of the dust by the cleaning operation to the outside is required to meet the needs of the user as above.

SUMMARY

An object of the closure is to a visualization device for dust collection of a vacuum cleaner to enable a user to directly check a suction condition of the dust by collecting the portion of the dust suctioned during cleaning operations and exposing it to the outside.

Another object of the closure is to a visualization device for dust collection of a vacuum cleaner effectively discharging the collected dust to visualize the suction condition of the dust.

A visualization device for dust collection of a vacuum cleaner according to the closure, comprising: a collecting unit mounted in one side of transfer course of suction force suctioning a dust of the vacuum cleaner and moving at least portion of suctioned dust in one direction; a dust collecting unit, made of a transparent material, fastened to the collection unit and exposing the accommodating condition of the dust introduced through the collecting unit to the outside; a discharge unit guiding so that the air and the dust passing through the dust collecting unit are discharged into the transfer course of the suction force for the vacuum cleaner, and a foreign material discharge means forcibly discharging the dust remaining in the inside of the dust collecting unit into the outside by guiding the flowing of the air to the inside of the dust collecting unit by the operation of the user.

In the closure, when operating the vacuum cleaner, the user may easily check the suction condition of the dust to allow the suction condition of the dust to be exposed to the outside of the dust collecting unit made of the transparent material.

Further, the dust collecting unit is provided with the foreign material discharge means forcibly discharging the collected dust. When the user performs the pressing operation, the foreign material discharge means may effectively discharge the dust collected to the dust collecting unit by forcibly flowing outer air into the corner of the dust collecting unit.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** shows a shape of a vacuum cleaner according to an exemplary embodiment of the disclosure.

FIG. **2** shows a condition in which a visualization device for dust collection of a vacuum cleaner according to an exemplary embodiment of the disclosure is mounted in one side of a suction nozzle.

FIGS. **3** and **4** show a mounting structure for the visualization device for dust collection of the vacuum cleaner according to an exemplary embodiment of the disclosure.

FIG. **5** shows a detailed configuration for the visualization device for dust collection of the vacuum cleaner according to an exemplary embodiment of the disclosure.

FIG. **6** shows the condition in which a push-button is pressed in the FIG. **5**.

FIG. **7** shows the condition in which the dust of the inside of the visualization device for dust collection of the vacuum cleaner according to another embodiment of the disclosure is removed.

FIG. **8** shows a detailed configuration for the visualization device for dust collection of the vacuum cleaner according to another exemplary embodiment of the disclosure.

FIG. **9** shows the condition in which a push-button is pressed in the FIG. **8**.

FIG. **10** shows a detailed configuration for the visualization device for dust collection of the vacuum cleaner according to another exemplary embodiment of the disclosure.

FIG. **11** is an exploded perspective view of FIG. **10**.

FIG. **12** shows the condition in which the dusts are discharged in another exemplary embodiment of the disclosure.

DETAILED DESCRIPTION

Hereinafter, an exemplary embodiment of the closure will be described in detail with reference to drawings. However, the ideas of the closure is not limited to the presented embodiment and one skilled in the art understanding the ideas of the closure may easily propose another embodiment within the same range of the ideas.

FIG. **1** shows a shape of a vacuum cleaner according to an exemplary embodiment of the disclosure, FIG. **2** shows a condition in which a visualization device for dust collection of a vacuum cleaner according to an exemplary embodiment of the disclosure is mounted in one side of a suction nozzle and FIGS. **3** and **4** show a mounting structure for the visualization device for dust collection of the vacuum cleaner according to an exemplary embodiment of the disclosure.

As shown in these drawings, a vacuum cleaner according to the disclosure includes a body **1** generating a suction force using a suction motor, a connection portion **20** transmitting the suction force generated by the body **1**, and a suction nozzle **100** disposed at one side of the connection portion **20** and a suction nozzle sucking a foreign material scattered at a side to be cleaned, along an air.

The connection portion **20**, in which the suction nozzle **100** is mounted at its one end, includes a length-adjustable extension tube **22**, and a connection tube **24** made of a flexible material and connecting the extension tube **22** and the body **1** to each other.

The shape of the suction nozzle **100** is formed by a case **120** and the case **120** includes an upper case **124** and a lower case **122** to be coupled to each other.

Further, a connection portion **140** having a diameter corresponding to the diameter of the extension tube **22** so as to be infilled-mounted in the extension tube **22** is disposed at a lateral end of the upper case **124** and the lower case **122**.

On the other hand, a visualization device for dust collection **200** visualizing a collecting condition of the foreign material in one side of a transmitting course of the suction force generated by the body **1** into the outside is disposed at one side of the case **120**.

The visualization device for dust collection **200** according to an exemplary embodiment of the disclosure displays a accommodating condition of the dust to the outside by accommodating a portion of the air and the dust contained in the air collected through the suction nozzle **100** and shields the portion of the flowing course of the air moving into the body **1**, disposed at a front of the connection portion **140**.

Therefore, the portion of the air moving into the body **1** may be introduced into the inside of the visualization device for dust collection **200**.

On the other hand, the suction nozzle **100** to be showed is infilled-mounted in the extension tube **22** to clean a bed linen such as a covers or a mattress or knitted goods with a number of fine hairs or fluffs such as a blanket or a carpet and includes a turbine **160** generating a vibration to the inside of the case **120**, and a vibration frame **180** generating the vibration by a rotation of the turbine **160**.

Further, an air inlet hole **123** introducing the outer air into a position corresponding to a mounting position of the turbine **160** is disposed at the upper case **124** so as to smoothly rotate the turbine **160**.

Therefore, the turbine **160** rotates by using the air introduced into the air inlet hole **123** along the air introduced from the inlet (not shown) formed in a bottom of the suction nozzle **100**.

Further, the turbine **160** is connected to the vibration frame **180** by using an eccentric cam and the vibration frame **180** connected to the turbine **160** vibrates when the turbine **160** rotates.

In addition, the mounting position of the turbine **160** is positioned at a front of the visualization device for dust collection **200**, and the air forcibly flowed by the turbine **160** and the dust contained in the air may be easily introduced into the inside of the visualization device for dust collection **200**.

Hereinafter, the visualization device for dust collection **200** having the mounting position mentioned above will be described with reference to drawings.

FIG. **5** shows a detailed configuration for the visualization device for dust collection of the vacuum cleaner according to an exemplary embodiment of the disclosure. FIG. **6** shows the condition in which a push-button is pressed in the FIG. **5**.

As shown in these drawings, the visualization device for dust collection **200** of the vacuum cleaner according to an exemplary embodiment of the disclosure includes a collecting unit **220** guiding the introduction into the inside of the air and the dust, a dust collecting unit **240** extrinsically exposing the dust introduced through the collecting unit **220**, a foreign material discharge means **300** removing the dust remaining in the dust collecting unit **240**, and a discharge unit **260** communicated with the dust collecting unit **240** and guiding the discharge of the dust and the air.

In detail, the collecting unit **220** is formed by a cylindrical shape having an upper opening and is provided with a mounting projection **221** formed to be projected from the outside so that the air and the dust suctioned into the inside of the case **120** are not leaked into the mounting portion whiling maintaining a fixed position mounted in the case **120** at the top edge.

Further, the portion of the outside of the collecting unit **220** is formed to be projected toward the mounting position of the turbine **160**, and the inlet **222** is disposed at the projection portion formed above so that the air and the dust are introduced into the inside of the collecting unit **220**.

The inlet **222** is formed to guide the flowing of the air in the direction of the tangent line for the inside of the collecting unit **220**, and the air introduced into the inside of the collecting unit **220** moves while rotating along with its inside.

One hand, the dust collecting unit **240** accommodating the air transferred while rotating through the inlet **222** and the dust contained in the transferred air is mounted in the top of the collecting unit **220**.

The dust collecting unit **240** is made of a transparent material so that the accommodating condition of the dust may be exposed into the outside, and includes a second housing **244** directly fastened to the top of the collecting unit **220** and a first housing **242** sliding-movably provided to the outside of the second housing **244**.

The second housing **244** is formed of shape of a Cup having a diameter slightly greater than the opened top of the collecting unit **220** and is configured to be fastened to top of the collecting unit **220** while rotating.

To this end, the fastening projection (not given reference numerals) projected from the outside of the collecting unit **220** is disposed at the top of the collecting unit **220**. When the fastening projection is accommodated into the second housing **244** to rotate the second housing **244** or the collecting unit **220**, a fastener **245** is further formed so that the fastening projection is inserted while moving toward one direction.

That is, the fastener **245** is projected from the outside of the second housing **244** to form a space to enable the fastening projection to insert and mount, and the collecting unit **220** may be coupled with the second housing **244** by inserting and mounting the fastening projection into the space.

Further, the rod **249** to be projected upward is disposed at the top side of the second housing **244**. The description relating to the **249** will be described in more detail below.

The first housing **242** is formed of shape of a Cup surrounding the second housing **244**, and is connected to the push-button **310** to be described below to allow the sliding to move toward a pressurization direction together with the push-button **310** when pressing the push-button.

To this end, a guide rib **246** is longitudinally formed on the inside of the first housing **242** in a sliding moving direction, a guide groove (not shown) at a position corresponding to the guide rib **246** is formed on the outside of the second housing **244**. Meanwhile, the guide rib **246** is formed on the outside of the second housing **244**, and it is possible to form the guide groove on the inside of the first housing **242**.

Further, the center of the first housing **242** and the push-button **310** are punched to enable the rod (**249**) to pass. Therefore, the first housing **242** and the push-button **310** is able to slide downward without interference along with the rod **249** when pressurizing the push-button **310**.

On the other hand, the dust transferred through the collecting unit **220** when operating the vacuum cleaner is stacked while rotating in the dust collecting unit **240** formed above.

Further, when the dust is stacked in the dust collecting unit **240**, a user operates the foreign material discharge means **300** so as to discharge the dust.

The foreign material discharge means **300** forces the air to flow into the portion in which the dust is not easily discharged in the dust collecting unit **240**, that is, the corner such as a

contact portion between the second housing **244** and the collecting unit **220**, thereby easily discharging the dust in the dust collecting unit **240**.

To this end, first, the dust collecting unit **240** is formed with a second vent **243** punched near the top of the collecting unit **220** in the bottom of the second housing **244**, and the second vent **243** is disposed so that the outer air is introduced into the inside of the second housing **244**. Further, a first vent **241** punched at the position higher than the position of the second vent **243** is formed in the first housing **242**, and the push-button **310** is disposed at the top of the first housing **242** so that first vent **241** and the second vent **243** may be selectively communicated to enable the external pressure to be transferred into the first housing **242**.

Further, when an external pressure applied to the push-button **310** is released for the foreign material discharge means **300**, the push-button **310** and the first housing **242** returns to its initial position. An elastic member **320** is inserted into the rod **249** to elastically support a space between the first housing **242** and the second housing **244** so that the outer air is not introduced into the inside of the second housing **244** through the first vent **241** and the second vent **243**.

Therefore, when discharging the dust from the inside of the dust collecting unit **240**, that is, the inside of the second housing **244**, after the operation of the vacuum cleaner is stopped, the user presses the push-button **310**. Then, when the first housing **242** is sliding-moving downward, the second vent **243** formed in the second housing **244** and the first vent **241** of the first housing **242** are communicated with each other, and the air is introduced into the inside of the second housing **244**.

That is, when stopping the vacuum cleaner, there is some degree of vacuum pressure on the inside of the suction nozzle **100**. when the first vent **241** and the second vent **243** are communicated with each other by pressing the push-button **310**, the outer air is rapidly introduced into the inside of the second housing **244**.

Further, the introduced air is introduced into the top of the collecting unit **220**, that is, the inside of the second housing **244** and therefore, the dust remaining in the corner is removed by the introduced air. The removed air falls through opened top of the collecting unit **220**.

On the other hand, the discharge unit **260** guiding the discharge of the air circulating the dust collecting unit **240** and a filth is also disposed at the bottom of the collecting unit **220**.

As shown in FIG. **5**, the discharge unit **260** is formed of shape of a fence projecting with a predetermined height from the bottom of the collecting unit **220** and includes the discharge port **262**, in which one side of the discharge unit **260** is opened, discharging the air introduced into the discharge unit **260** into the outside of the collecting unit **220**

On the other hand, the discharge unit **260** has a side with slant to be connected with the collecting unit **220** at the opened one side, is projected exteriorly with fixed length from the one surface of the slanted discharge unit **260** and includes the discharge port **262** opened from the projected portion to the slanted side (refer to FIG. **6**).

Therefore, the air and the dust passing through the dust collecting unit **240** may be smoothly guided and discharged by the discharge unit **260** and the discharge port **262** formed at the same.

That is, when operating the vacuum cleaner, the portion of the air and the dust introduced through the suction nozzle **100** is introduced into the inside of the dust collecting unit **240** through the collecting unit **220**, and the rotating condition of the dust introduced into the inside of the dust collecting unit **240** is exposed into the outside of the dust collecting unit **240**.

The user checks the amount of dust exposed into the outside of the dust collecting unit **240**, determines time empting the dust of the dust collecting unit **240**, and presses the push-button **310** when empting the dust.

When the user presses the push-button **310**, the push-button **310** and the first hosing **242** connected to the same move downward to allow the first vent **241** and the second vent **243** to position on the same line. Then, the second vent **243** is opened and the dust stacked at its inside is removed by introducing the outer air into the inside of the second hosing **244**.

Further, when the user presses the push-button **310**, the elastic member **320** is compressed. When the pressure applied to the push-button **310** is released, the push-button **310** and the first housing **242** move upward by the elastic member **320**. Then, the second vent **243** that has been communicated is shielded.

On the other hand, a cone **270** (refer to FIG. **7**) forming a cyclone flowing of the introduced air is also disposed at the inside of the visualization device for dust collecting **200** according to the closure.

FIG. **7** shows the condition in which the dust of the inside of the visualization device for dust collection of the vacuum cleaner according to another embodiment of the disclosure is removed.

As shown, a cone **270** forming the cyclone flowing is also disposed at the top of the collecting unit **220** according to above-described embodiment of another embodiment of the disclosure.

In addition, the position of the second vent **243** formed in the second housing **244** is disposed at the bottom side of the cone **270** according to above-described embodiment and the first vent **241** of the first housing **242** is formed to be positioned at the position higher than the position of the second vent **243**.

Since other remaining configuration is the same as the above-described embodiment, the detailed description will be omitted. When operating the vacuum cleaner according to another embodiment configured above, the rotation of the dust and the air introduced through the collecting unit **220** is more smoothly performed by the cone **270** to separate the dust among the air, thereby collecting the separated dust into the dust collecting unit, that is, the inside of the second housing **244**.

If the user press the push-button **310** under the same condition as above, the first vent **241** moving downward by the pressure applied to the second vent **243** disposed at the bottom of the cone **270**, and the push-button **310** is communicated to introduce the air. The introduced outer air transfers the dust along with the top of the cone **270** from the bottom of the cone **270** so as to discharge into the center of the cone **270**, such that the dust of the inside of the dust collecting unit **240** is removed more efficiently.

On the other hand, the visualization device for dust collection **200** according to the disclosure may be configured as another type.

FIG. **8** shows a detailed configuration for the visualization device for dust collection of the vacuum cleaner according to an exemplary embodiment of the disclosure. FIG. **9** shows the condition that a push-button is pressed in the FIG. **8**.

As shown in these drawings, the dust collecting unit **240** is configured as type different from above-described embodiment according to another embodiment of the disclosure.

In the dust collecting unit **240** according to another embodiment of the disclosure, the first housing **242** forming the shape is fastened to the collecting unit **220**. Further, the

second housing **244** is sliding-movably disposed vertically at the inside of the first housing **242** by the foreign material discharge means **300** to be described below and the outer air is introduced into the inside of the second housing **244** to discharge the collected dust.

In detail, the foreign material discharge means **300** includes the first vent **241** and the second vent **243** formed in the first housing **242** and the second housing **244**, respectively, and the push-button **310** and the elastic member **320** sliding-moving the second housing **244** so that the first vent **241** and the second vent **243** are communicated with each other.

The first vent **241**, formed in the first housing **242**, is formed in the top of the collecting unit **220** and the portion in which the first housing **242** is fastened. In addition, the second vent **243**, formed in the second housing **244**, is formed in the position higher than the position of the first vent **241**.

Further, the push-button **310** penetrates the top of the first housing **242** to contact the second housing **244**. Therefore, when the user presses the push-button **310**, the second housing **244** is pressurized by the push-button **310**, thereby sliding-moving.

Further, the elastic member **320** is disposed at the bottom of the second housing **244** so that the second housing **244** moves downward by the push-button **310** and then may return to its initial position.

The elastic member **320** may be configured in a type of a pocket spring and a number of the elastic member **320** may be disposed to support at least two spots of the second housing **244**.

On the other hand, although not shown, in another embodiment of the disclosure, the cone **270** shown in FIG. **7** is disposed at the top of the collecting unit **220**, and the first vent **241** and the second vent **243** may be disposed at the bottom side of the cone **270**.

FIG. **10** shows a detailed configuration for the visualization device for dust collection of the vacuum cleaner according to another exemplary embodiment of the disclosure and FIG. **11** is an exploded perspective view of FIG. **10**.

As shown in these drawings, in another embodiment of the disclosure, the dust collecting unit **240** to be fastened to the collecting unit **220** is formed of a housing.

A number of a suction hole **290** are formed in the top of the dust collecting unit **240** so that the outer air may be introduced into the inside of the dust collecting unit **240**.

The top of the dust collecting unit **240** has a diameter narrower than that of the bottom thereof, the top of the dust collecting unit **240** is selectively shielded by the foreign material discharge means **300** to be described below, and therefore, the introduction of the outer air discharging the dust into the inside of the dust collecting unit **240** may be performed if necessary.

The foreign material discharge means **300** includes the suction hole **290**, a shield member **340** sliding-moving in the inside of the dust collecting unit **240** and shielding the top having narrow diameter of the dust collecting unit **240**, the push-button **310** and the elastic member **320** sliding—moving the shield member **340**, and a discharge guide **360** disposed at the bottom of the shield member **340** and guiding the flowing of the introduced air.

In detail, in the push-button **310**, the top thereof is exposed to the outside of the dust collecting unit **240** and the portion of the bottom thereof is mounted to penetrate the center of the dust collecting unit **240** Further, the shield member **340** is mounted in the bottom of the push-button **310** positioned at the inside of the dust collecting unit **240** to be sled together with the push-button **310**.

In addition, the elastic member **320** is disposed between the push-button **310** and the dust collecting unit **240** and elastically compressed when pressurizing the push-button. Then, the elastic member **320** is elastically restored when pressure-releasing to enable the push-button **310** to return to its initial position.

As shown, the diameter of the shield member **340** is smaller as it goes from the bottom thereof to the top thereof. The bottom thereof contacts the inside wall of the top of the dust collecting unit **240** to shield the suction hole **290**

On the other hand, the discharge guide **360** is extended toward the bottom, that is, combination portion of the top of the collecting unit **220** and the dust collecting unit **240** to be lined up with the inside wall of the dust collecting unit **240** at the position slightly spaced inward from a edge of the shield member **340**

Accordingly, when the push-button **310** is pressurized and the suction hole **290** is opened while sliding—moving the shield member **340**, the outer air introduced through the suction hole **290** is guided to the space of the discharge guide **360** and the inside wall of the dust collecting unit **240** to be supplied toward the combination portion of the top of the collecting unit **220** and the dust collecting unit **240**, thereby easily removing the dust positioned at the corner of the inside of the dust collecting unit **240**.

On the other hand, a cone **270**(refer to FIG. **12**) forming a cyclone flowing is also disposed at the inside of the dust collecting unit **240** as above-described embodiment according to another embodiment of the disclosure configured as above.

FIG. **12** shows the condition in which the dusts are discharged in another exemplary embodiment of the disclosure.

The configuration of FIG. **12** is the same configuration as the configuration of embodiment shown in FIG. **10** and FIG. **11** according to another embodiment of the disclosure but the cone **270** is further disposed at the inside of the dust collecting unit **240**.

The dust and the air introduced through the collecting unit **220** is separated while being subjected to the cyclone flowing by the cone **270**. the separated dust is collected into the inside of the dust collecting unit **240** and the collected dust is exposed to the outside through transparent dust collecting unit **240**, such that the user may check the suction condition of the dust.

Further, when a great deal of dust is collected into the inside of the dust collecting unit **240**, the user presses the push-button **310**. At this time, the discharge guide **360** extended toward the bottom of the cone **270** from the one side of the shield member **340** guides the air introduced into the inside of the dust collecting unit **240** to the bottom of the cone **270**, such that the air moves along with the outside from the bottom of the cone **270** to remove and discharge the dust (refer to drawing on the right of FIG. **12**).

What is claimed is:

1. A suction nozzle for a vacuum cleaner, comprising:

a nozzle case having a suction inlet through which air and dust are introduced into the nozzle case;

a dust collection device mounted to the nozzle case, the dust collection device comprising a first housing having a first vent formed on the first housing to introduce outer air into the first housing, and a second housing having a second vent and being disposed outside of the first housing;

a guide device that guides the air and the dust to the dust collection device; and

a push button to move one of the first housing or second housing such that the first and second vents communicate with one another.

2. The suction nozzle of claim **1**, wherein the push button is connected to the first housing to move the first housing with respect to the second housing.

3. The suction nozzle of claim **2**, wherein the first housing moves between a first position and a second position, and wherein the second vent is covered by the first housing when the first housing is located in the first position and the second vent communicates with the first vent when the first housing is located in the second position.

4. The suction nozzle of claim **3**, further comprising an elastic member disposed between the first housing and the second housing to move the first housing from the first position to the second position.

5. The suction nozzle of claim **1**, wherein the push button is connected to the second housing to move the second housing with respect to the first housing.

6. The suction nozzle of claim **5**, wherein the second housing moves between a first position and a second position, and wherein the second vent is covered by the first housing when the second housing is located in the first position and the second vent communicates with the first vent when the second housing is located in the second position.

7. The suction nozzle of claim **5**, further comprising an elastic member to move the second housing from the first position to the second position.

8. The suction nozzle of claim **1**, further comprising a guiding rib formed on the first housing or the second housing so that at least one of the first housing or the second housing stably moves.

9. The suction nozzle of claim **1**, wherein a cone is disposed in the second housing and separates foreign material within the air by cyclone-flowing the air.

10. The suction nozzle of claim **9**, wherein the second vent is disposed between the first vent and the cone.

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